PENFIELD REEF LIGHTHOUSE
Long Island Sound
Bridgeport
Fairfield County
Connecticut

HAER No. CT-171

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

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Location: Long Island Sound, Bridgeport, Fairfield County, Connecticut

41°07.0'N, 73°13.3'W (no U.S.G.S. quadrangle map exists for this location)

Engineer/Architect: U.S. Lighthouse Board

Fabricator: Unknown

Date of Construction: 1874

Present Owner: United States Coast Guard
Aid to Navigation Team
120 Woodward Avenue
New Haven, CT 06512

Present Use: Active navigational aid

Significance: Penfield Reef Lighthouse, completed in 1874, is a significant example of mid-nineteenth-century lighthouse engineering and design. It was among the last water-bound masonry lighthouses constructed in the United States before the U.S. Lighthouse Board switched to cast-iron materials in the 1870s. Its Second Empire design reflected the national enthusiasm for revival architectural styles. Penfield Reef Lighthouse is also significant in the history of navigational aids in Long Island Sound as part of the federal program to accommodate post-Civil War shipping in Bridgeport Harbor.

Project Information: The United States Coast Guard (USCG) proposes to install a solar power array on its Penfield Reef Lighthouse. The proposed project will impact the historic and engineering integrity of this property. The lighthouse is listed in the National Register of Historic Places as part of a thematic nomination of Operating Lighthouses in the State of Connecticut. In accordance with an agreement between the United States Coast Guard and the Connecticut State Historic Preservation Office (SHPO), Historic American Engineering Record documentation is to be prepared for the lighthouse prior to installation of the solar array.

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PART I. DESCRIPTIVE INFORMATION

The 1985 *National Register of Historic Places Inventory—Nomination form for the Penfield Reef Lighthouse* describes the structure as follows:

Penfield Reef Lighthouse, completed in 1874, stands in five feet of water, marking a bedrock reef at the end of a narrow mud shoal which extends southeast from Fairfield Beach, Connecticut, into Long Island Sound. The structure consists of a square, two-story dwelling with a mansard roof and a wood-frame light tower above, mounted on a cylindrical granite base protected by a stone riprap breakwater. The site also includes a boat landing, which projects from the north side of the base, with two flights of concrete steps that connect the landing with the main lighthouse deck.

The cylindrical base is faced with nine courses of rusticated granite blocks, and tapers from a diameter of forty-eight feet, nine inches at the base to forty-six feet, six inches at the top. The base is filled with concrete, and has a rectangular cavity in the upper portion, which contains the cistern, cellar, and toilet. The top of the pier, originally covered with granite slabs, is presently surfaced with cement, and ringed with a simple pipe railing.

The square dwelling, measuring twenty-eight feet on each side, rises from the center of the pier. The first story is of granite masonry construction, and the second story and tower are timber-framed. The first floor walls are faced with quarry-faced, grey granite ashlar with slightly projecting quoins. The watertable is defined by granite blocks of a larger scale. The projecting cornice at the base of the mansard roof supports gutters, from which pipes descended at the northwest and northeast corners of the structure through leaders into the cistern in the northeast corner of the cellar. Asbestos shingle roofing covers both the lower slope of the mansard roof and the shaft of the tower. The attached light tower rises from the roof line at the center of the south elevation. The light tower is seven feet, six inches square at the level of the second story, and octagonal in plan at the level of the watch room above. Above the watch room is an octagonal lantern with a surrounding gallery and shallow conical roof.

Several Second Empire-style features are present in the lighthouse's design, including its cube-like proportions, square plan, mansard roof, quoins, and heavy window and door surrounds. On the first story, door and window openings are rectangular, embellished with a simple trim of granite blocks with dressed borders around rough-textured faces. The south and west elevations each contain three windows, while the north elevation contains one window and a kitchen door. The east elevation contains the main entrance and two windows. Door trim is similar to that of the window openings, with the addition of quarter-round molding detail atop the lintels, which extend at either side to form ears. The original wood doors have been replaced with steel panels. The center window on the first story of the south elevation is blank, with original granite infill. All windows have been blocked off with steel panels.

The octagonal watch room has three windows, now covered, facing west, south, and east, respectively. A ladder in the watch room leads to a trap door in the floor of the octagonal lantern above. The lantern walls contain eight rectangular glass panes in their upper half and eight cast iron sections in their lower half. The north, east, and west sections each contain a ventilator, while the south section contains a door to the lantern gallery. The conical cast iron lantern roof retains its spherical ventilator surmounted by a lightning-conductor spindle. Galvanized metal sheeting covers the lantern gallery deck. The railing around the lantern

gallery is supported by an iron railing with diagonal braces. A ladder leads from the north side of the lantern gallery to the mansard roof.

The interior has four levels. The basement has brick-lined walls and a multi-level floor, which originally supported diesel-electric generating equipment. Modern lally columns support the massive ceiling timbers. The first floor includes the kitchen, now altered to house the electrical and navigational equipment. Additional rooms, now stripped of fixtures, included a battery room and two supply rooms. The second floor is reached by a three-stage, winding staircase, which opens onto a central hall connecting three bedrooms and a toilet. These rooms have also been stripped of their original fixtures. An outstanding feature of the interior is the oval-plan, winding watch room staircase, which originally included turned balusters and newel posts, and a graceful wood handrail, now replaced with plank posts and a rope railing.

The focal plane of the lighting apparatus is recorded as 51 feet above water level. The present light consists of a 1000 watt lantern, flashing a red signal every 60 seconds. A fog-signal operated by a fog detector sounds a blast every 15 seconds when required.

PART II. HISTORICAL INFORMATION

The 1985 *National Register of Historic Places Inventory—Nomination form for the Penfield Reef Lighthouse* recounts the history of the structure as follows:

Penfield Reef Lighthouse, completed in 1874, is a significant example of the masonry dwelling-with-tower design employed by the on many of the lighthouses it constructed during the 1860s and 1870s. These designs often incorporated elements of prevailing domestic styles and reflected a national enthusiasm for picturesque revival architecture. Penfield Reef Lighthouse was among the most elaborate designs constructed by the U.S. Lighthouse Board during the period. A picture of the lighthouse was included in the Board's exhibit at the Centennial Exhibition in Philadelphia in 1876. Penfield Reef Lighthouse also is significant in the history of aids to navigation in Long Island Sound, as an important part of the federal program to accommodate increased commercial traffic in the Bridgeport Harbor area after the Civil War.

Temporary lighted navigational aids were constructed in the American Colonies as early as the first half of the seventeenth century. The first permanent lighthouse was built on Little Brewster Island in Boston Harbor in 1716. The New London Harbor Light, established in 1760, was the first permanent lighthouse erected on Long Island Sound. A series of other lights were constructed along the northeastern coast to improve navigation on the busy shipping lanes between New York and Boston during the late eighteenth and early nineteenth centuries.

Penfield Reef, bedrock outcropping covered by five feet of water at the end of a narrow mud shoal southeast from Fairfield Beach, was long recognized as a significant hazard for ships entering and leaving Bridgeport Harbor. An attempt to mark the shoal in the mid-nineteenth century resulted in the placement of an inadequate, unlit, can-type buoy that did little to warn ships when visibility was poor. Finally, in 1866 lobbying efforts from Bridgeport maritime interests resulted in a proposal by the U.S. Lighthouse Board for a permanent lighthouse at Penfield Reef. Marking the shoal with a light and a fog signal would enable ships to travel directly between Bridgeport's burgeoning harbor and New York City at all hours and in all weather

conditions. The relatively remote site, however, presented a significant engineering problem. It required a massive masonry foundation of granite blocks, cut to fit together to form rings which could be filled with riprap. Cut stone foundations were the only solution available at the time for underwater sites in latitudes where floating ice made the slender legs of a screwpile, or tubular pipe foundation, unusable.

The domestic model which characterizes Penfield Reef Lighthouse was used previously in Hudson River lighthouses. Joseph Lederle, Acting Lighthouse Engineer for the Third District of the U.S. Lighthouse Board, recommended in April 1868, that the Penfield Reef structure "...be built on the plan approved by the (Lighthouse) Board for the Hudson River stations." At the Esopus Meadows Lighthouse (New York), established in 1871, this exact design appears, in frame construction instead of masonry. The Bridgeport Harbor Lighthouse (Connecticut), Hart Island Lighthouse (New York) in Long Island Sound, Sabin's Point, Light Station (Rhode Island), and Colchester Reef Lighthouse on Lake Champlain were all constructed according to this plan.

Procuring the needed appropriations from Congress delayed the approval of plans for the foundation until after March 3, 1871, when a total of $55,000.00 was made available. The riprap foundation and granite pier were built over a two-year span between 1871 and 1873. The dwelling was completed in 1873, and the light was first exhibited on January 16, 1874.

By the time Penfield Reef Lighthouse was completed, the technology and materials used to erect its foundation, along with the dwelling-with-tower design, were beginning to be superseded by the more cost-effective methods of prefabricated cast-iron construction. Penfield Reef, therefore, represents one of the last examples of a masonry domestic model lighthouses on a masonry foundation.

A fog-bell, struck by machinery, was the first fog warning apparatus at Penfield. The foghorn installed in Penfield Reef Light was audible fifteen or twenty minutes away, according to early reports. This apparatus was replaced in 1892 by a Daboll trumpet operated by Rider hot-air engines. In 1898 the Rider engines were replaced by two Hornsby-Akroyd oil engines. A fourth order lens A bulls eye lens, run by clockwork manufactured in the lamp shop at Tompkinsville, New York, was in operation by 1889. Ultimately, however, that early equipment was replaced during the full automation of the lighthouse in December 1971.

PART III. SOURCES OF INFORMATION

A. Plans and Drawings

United States Coast Guard Civil Engineering Unit, Metro Center Boulevard, Warwick, RI

B. Historic Views

None located

C. Bibliography

Smith, Edward, Dorothy B. Templeton and Richard Meyer
1986 *Historic Sites Survey, Inventory and Analysis of Aids to Navigation in the State of Connecticut.* John Milner Associates, Inc., West Chester, PA

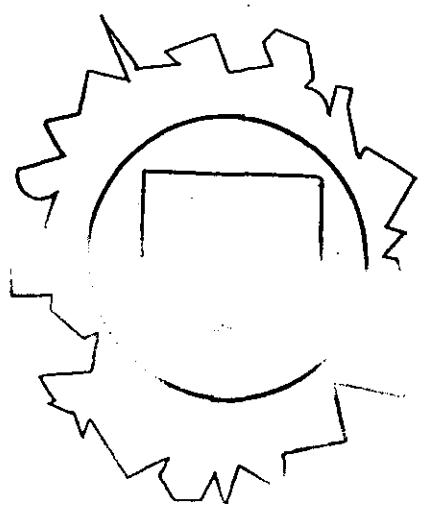
_____.
1986 *Historic Sites Survey, Inventory and Analysis of Aids to Navigation in the State of Connecticut: Appendix C—Condition Reports: Penfield Reef.* John Milner Associates, Inc., West Chester, PA

Templeton, Dorothy B.
1985 *National Register of Historic Places Inventory—Nomination Form for the Penfield Reef Lighthouse.* Connecticut Historical Commission, Hartford, CT

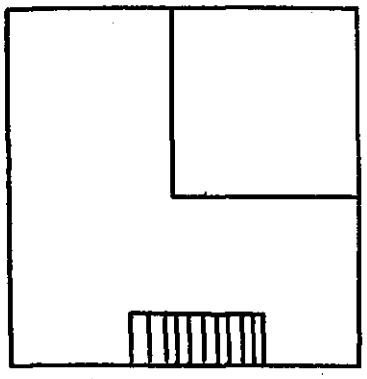
D. Interviews

None conducted

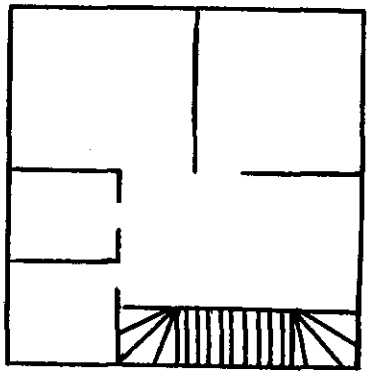
SITE PLAN



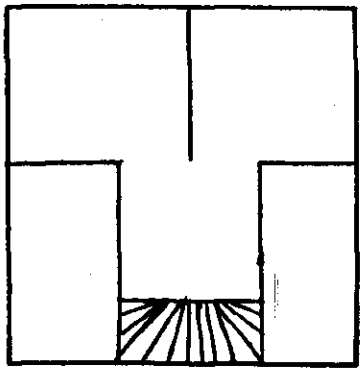
FLOOR PLANS



BASEMENT



FIRST FLOOR



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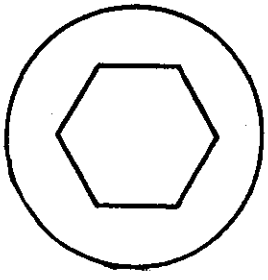

LANTERN